

December 13, 2004

TO: G. Burke

FROM: A. Andujo

SUBJECT: Rosetta Post 2004 Support Study

This study is in response to a request from the Rosetta mission to identify any areas of heavy DSN support contention for the Rosetta mission. Primarily the purpose of this study is to evaluate the DSN's ability to support the Rosetta missions newly added asteroid flyby supports in 2008 and 2010, as well as identify any areas of contention throughout the mission since launch.

### **Methodology**

Analysis was accomplished using the FASTER (Forecasting and Scheduling Tool for Earth-based Resources) forecasting system, TIGRAS (Tracking Integrated Ground Resource Allocation System) scheduling tool and the updated mission set database from inputs to the February 2005 Resource Allocation Review Board (RARB).

### **Assumptions**

- All events and support requirements are based on the User Loading Profile and Events file received in October 2004. (See Figure 1)
- The viewperiods used for this study were those delivered in SPK format from the project in October of 2004.

### **Summary of Results**

Analysis results indicate that the newly added support for Asteroid flyby 1 in 2008 is fully supportable. The Asteroid flyby 2 in 2010 deals with some contention for most of the period due to MSL and MTO Mars approach and MOI, continuous and near continuous activities. All other activities forecasted show that they are fully supportable by the DSN.

### **Analysis**

- Analysis for 2005 was performed by visually inspecting the already scheduled weeks 07 – 11 and verifying that all Rosetta Earth swingby 1 supports scheduled are conflict free. Comparison between actually scheduled and requested support time shows that Rosetta is exactly at or slightly above requirement. (See Figure 2)
- Forecasted support for Mars swingby 1 and Earth swingby 2 in years 2006 and 2007 shows that requested support for this period is fully supportable, with supportability figures between 96% – 100%. (See Figures 3 – 4)
- Forecasting shows that the DSN can provide 100% supportable time for the Asteroid flyby 1 activity in 2008. (See Figure 5)

- Forecasted support for the Earth swingby 3 shows that the activity is fully supportable with figures ranging from 86% - 100%. (See Figure 6)
- Asteroid flyby 2 in 2010 is in contention with MSL and MTO Mars approach and MOI, continuous and near continuous activities with supportable time ranging from 78% to 100%. (See Figure 7)
- Full supportability in the outer years of the mission, 2014 – 2015 is forecasted.

Overall the Rosetta mission can expect to meet requirements during most of its prime mission. In the planned scenario discussed in this study the Rosetta mission made little or in most cases no impact to other missions. In no way is any other mission or activity adversely affected. However the Rosetta, MARS and Sun viewperiods overlap heavily and any increase to Rosetta requirements can cause contention with Mars missions and DSN maintenance.

### **Recommendations**

With the exception of the Asteroid flyby 2 in 2010, the data reviewed shows that the project should receive its requested support with little or no problem. We recommend that the mission continue planning to these requirements and maintain the current level of support, an increase in requested time will result in contention with Mars missions and DSN maintenance. In 2010 we recommend that the mission be prepared to negotiate for their time during the Asteroid flyby 2. It is important to keep in mind that this period is still six years away and many changes to the loading profiles can occur. It may be too early to recommend drastic changes to this activity, but other means should be considered to support this activity.

As always, the results of this study are subject to change, in that network loading changes as requirements for planned missions are input and updated and periods of antenna downtime are identified. We will continue to work with the Rosetta mission and other users of the DSN to maximize the time available for each individual user.

cc: R. Bartoo  
 S. Guduru  
 E. Hampton  
 N. Lacey  
 D. Morris  
 G. O'Brien  
 J. Retana  
 N. Satterlee

### Figure 1: Rosetta User loading Profile Submitted October 2004

## User Loading Profiles

3-Dec-04

Concurrence:

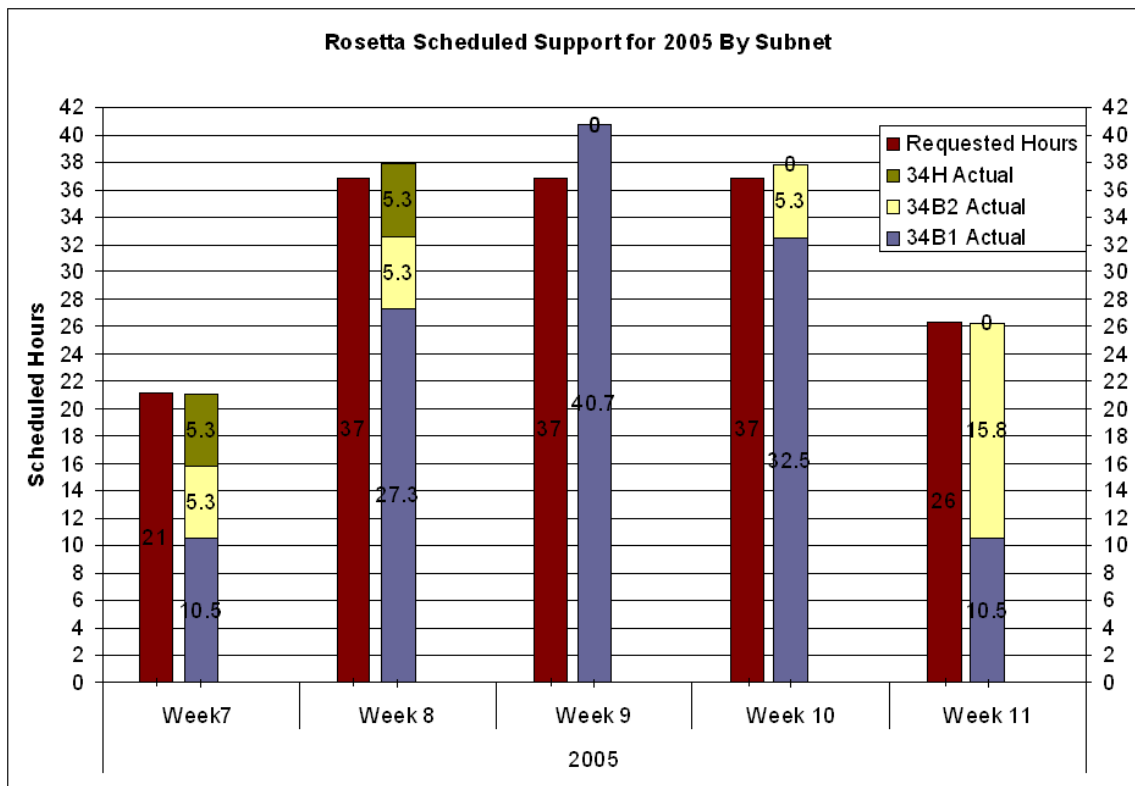
Project Manager

Date \_\_\_\_\_

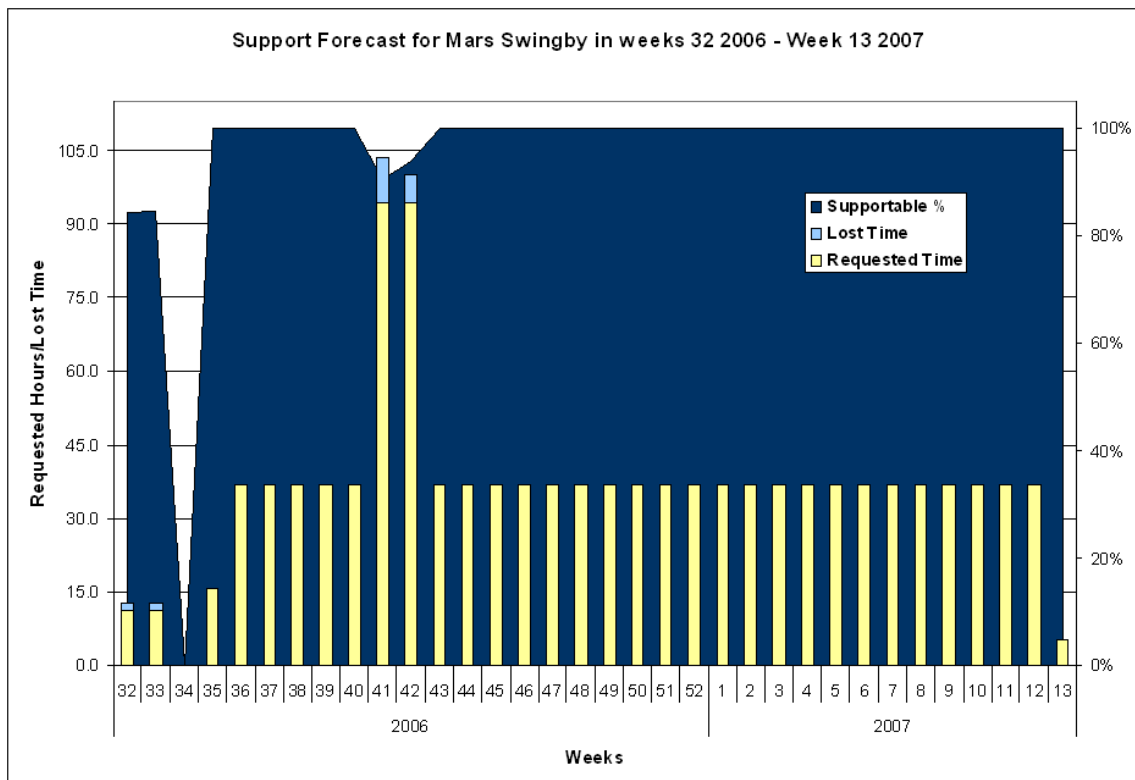
# Rosetta

[illegible]

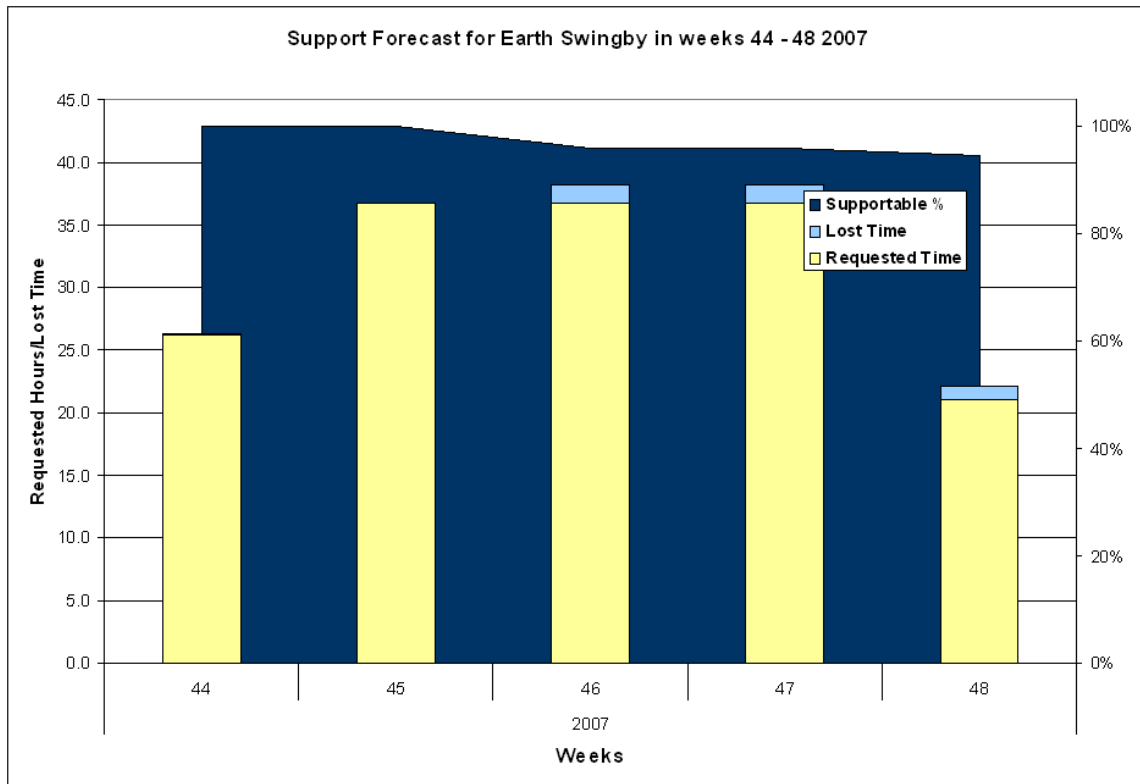
**Figure 2: Rosetta 2005 Earth Swingby 1 Scheduled Support**



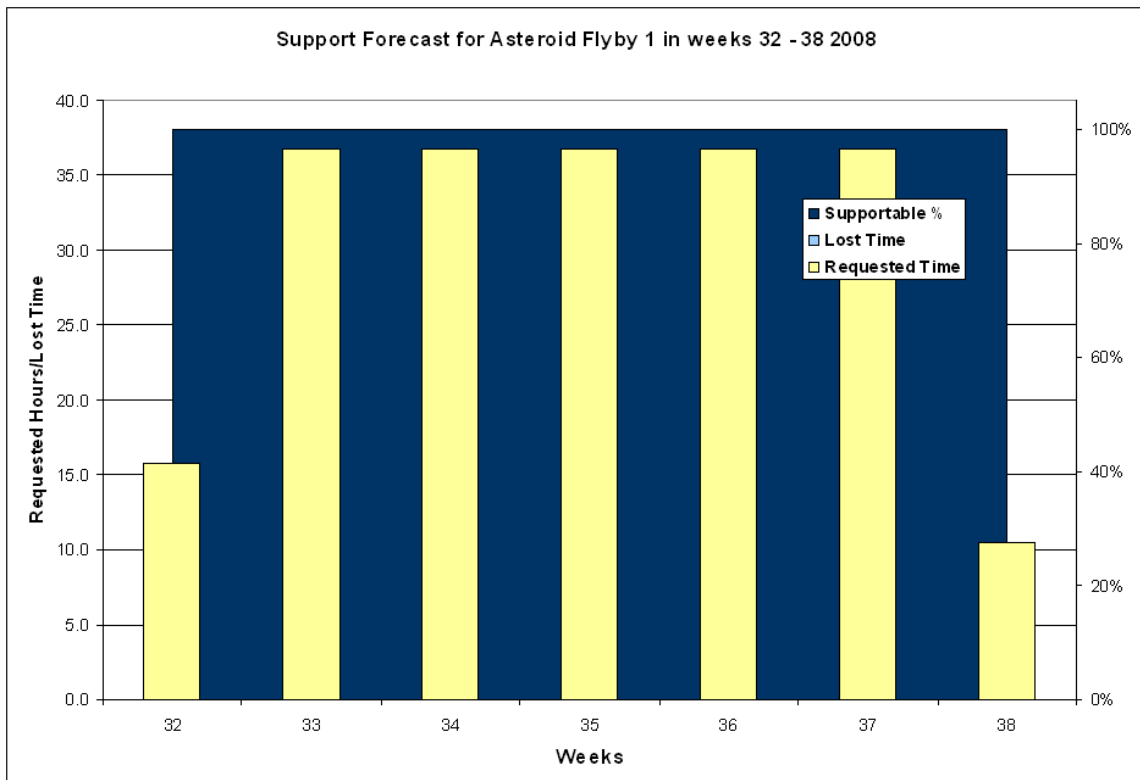
**Figure 3: Rosetta 2006 – 2007 Mars Swingby 1 Forecasted Support**



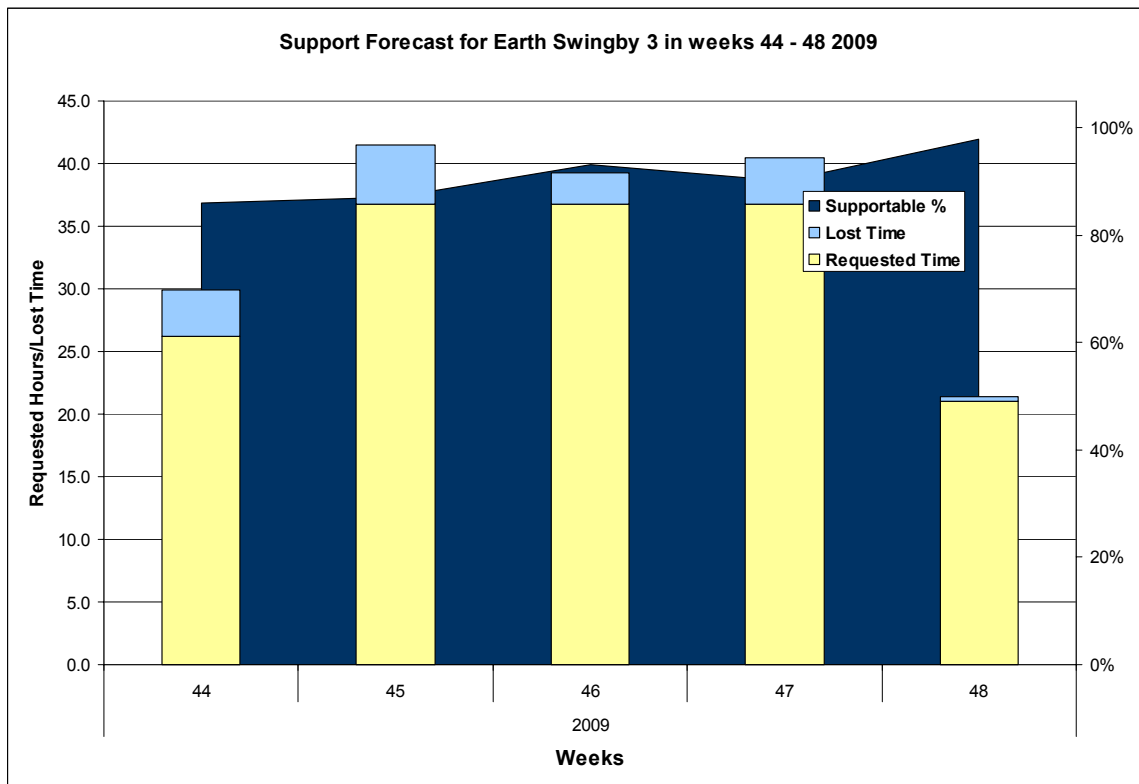
**Figure 4: Rosetta 2007 Earth Swingby 2 Forecasted Support**



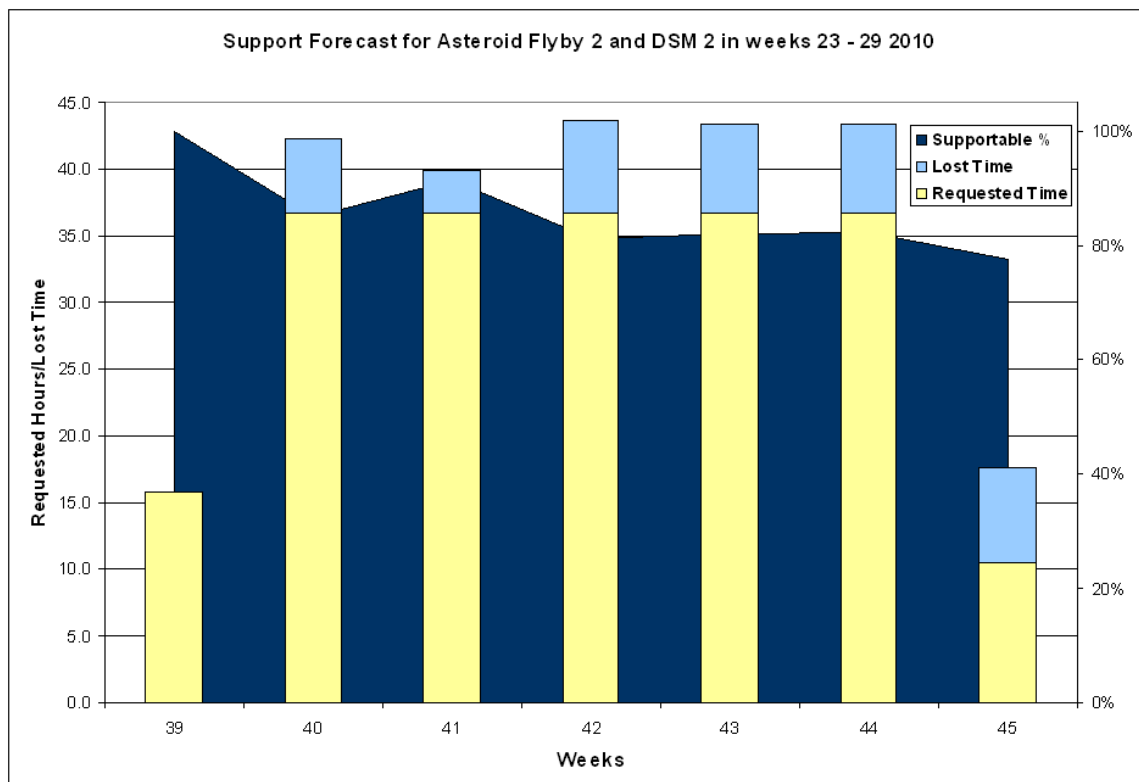
**Figure 5: Rosetta 2008 Asteroid Flyby 1 Forecasted Support**



**Figure 6: Rosetta 2009 Earth swingby 3 Forecasted Support**



**Figure 7: Rosetta 2010 Asteroid Flyby 2 Forecasted Support**



**Figure 8: Rosetta 2011 DSM 2 and DSHM Entry Forecasted Support**

